SEQUENCE LISTING

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<120>   IL-15 binding site for IL15-Ralpha, and specific
        agonists/antagonists deriving therefrom

<130>   FP/CC - PCT IL-15 muteins INSERM

<150>   ep04290542.2
<151>   2004-02-27

<160>   85

<170>   PatentIn version 3.2

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tggagcaatg ttccatcatg ttccatgctg ctgctgacgt cacatggagc acagaaatca   240

atgttagcag atagccagcc catacaagat cgtattgtat tgtaggaggc atcgtggatg   300

gatggctgct ggaaacccct tgccatagcc agctcttctt caatacttaa ggatttaccg   360

tggctttgag ta atg aga att tcg aaa cca cat ttg aga agt att tcc atc   411
               Met Arg Ile Ser Lys Pro His Leu Arg Ser Ile Ser Ile
               1   5   10

cag tgc tac ttg tgt tta ctt cta aac agt cat ttt cta act gaa gct   459
Gln Cys Tyr Leu Cys Leu Leu Leu Asn Ser His Phe Leu Thr Glu Ala
    15   20   25

ggc att cat gtc ttc att ttg ggc tgt ttc agt gca ggg ctt cct aaa   507
Gly Ile His Val Phe Ile Leu Gly Cys Phe Ser Ala Gly Leu Pro Lys
30   35   40   45

aca gaa gcc aac tgg gtg aat gta ata agt gat ttg aaa aaa att gaa   555
Thr Glu Ala Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu
                50   55   60

gat ctt att caa tct atg cat att gat gct act tta tat acg gaa agt   603
Asp Leu Ile Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser
            65   70   75

gat gtt cac ccc agt tgc aaa gta aca gca atg aag tgc ttt ctc ttg   651
Asp Val His Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu
        80   85   90

gag tta caa gtt att tca ctt gag tcc gga gat gca agt att cat gat   699
Glu Leu Gln Val Ile Ser Leu Glu Ser Gly Asp Ala Ser Ile His Asp
    95   100   105

aca gta gaa aat ctg atc atc cta gca aac aac agt ttg tct tct aat   747

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Thr Val Glu Asn Leu Ile Ile Leu Ala Asn Asn Ser Leu Ser Ser Asn
110             115             120                 125


ggg aat gta aca gaa tct gga tgc aaa gaa tgt gag gaa ctg gag gaa     795
Gly Asn Val Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu
                130             135             140

aaa aat att aaa gaa ttt ttg cag agt ttt gta cat att gtc caa atg     843
Lys Asn Ile Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met
            145             150             155

ttc atc aac act tct tga ttgcaattga ttctttttaa agtgtttctg           891
Phe Ile Asn Thr Ser
            160

ttattaacaa acatcactct gctgcttaga cataacaaaa cactcggcat ttcaaatgtg   951

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actttactca ttttttttaat ttattattga aattgtacat atttgtggaa taatgtaaaa 1131

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caatgctgca ggtcaacagc tatgctggta ggctcctgcc agtgtggaac cactgactac  1311

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gaaaaagaag aactatatgt gaatcctctt ctttatactg taatttagtt attgatgtat  1431

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Met Arg Ile Ser Lys Pro His Leu Arg Ser Ile Ser Ile Gln Cys Tyr
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Leu Cys Leu Leu Leu Asn Ser His Phe Leu Thr Glu Ala Gly Ile His
            20              25              30


Val Phe Ile Leu Gly Cys Phe Ser Ala Gly Leu Pro Lys Thr Glu Ala
            35              40              45


Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
    50              55              60


Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
65              70              75              80


Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln
                85              90              95
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Val Ile Ser Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
          100   105   110

Asn Leu Ile Ile Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
          115   120   125

Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
      130   135   140

Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
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Thr Ser

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1   5

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1   5

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<223> IL15 mutant

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Leu Asp Glu Leu Gln Val Ile Ser Leu
1   5

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1   5

<210> 9
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Leu Lys Glu Leu Gln Val Ile Ser Leu
1   5

<210> 10
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<400> 10

Leu Arg Glu Leu Gln Val Ile Ser Leu
1   5

<210> 11
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<400> 11

Leu Leu Glu Leu Gln Val Ile Asp Leu
1   5

<210> 12
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<400> 12

Leu Leu Glu Leu Gln Val Ile Glu Leu
1   5

<210> 13
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<400> 13

Leu Leu Glu Leu Gln Val Ile Lys Leu
1   5

<210> 14
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Leu Leu Glu Leu Gln Val Ile Arg Leu
1   5

<210> 15
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Leu Leu Glu Leu Gln Val Ile Ser Asp
1   5

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Leu Leu Glu Leu Gln Val Ile Ser Glu
1   5

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<400>   17

Leu Leu Glu Leu Gln Val Ile Ser Lys
1   5

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Leu Leu Glu Leu Gln Val Ile Ser Arg
1   5

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<400>   20

Arg Asn Leu Ile Ile
1   5

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Glu Asp Leu Ile Ile
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Glu Glu Leu Ile Ile
1               5


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Glu Lys Leu Ile Ile
1               5


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<400>   24

Glu Arg Leu Ile Ile
1               5


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<400>   25

Glu Asn Leu Ile Asp
1               5
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Glu Asn Leu Ile Glu
1               5


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Glu Asn Leu Ile Lys
1               5


<210>   28
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<220>
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<400>   28

Glu Asn Leu Ile Arg
1               5


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Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
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Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
            20                  25                  30


Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Asp Glu Leu Gln
        35                  40                  45


Val Ile Ser Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
    50                  55                  60
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```
Asn Leu Ile Ile Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65                  70              75                  80


Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
                85              90                  95


Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
                100             105                 110


Thr Ser
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<211>   114
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Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
1               5                   10                  15


Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
                20              25                  30


Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Glu Glu Leu Gln
                35              40                  45


Val Ile Ser Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
        50              55                  60


Asn Leu Ile Ile Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65                  70              75                  80


Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
                85              90                  95


Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
                100             105                 110


Thr Ser
```

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1               5                   10                  15

Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
            20              25                  30

Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Lys Glu Leu Gln
            35              40              45

Val Ile Ser Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
    50              55                  60

Asn Leu Ile Ile Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65              70              75                  80

Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
                85              90                  95

Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
            100             105             110

Thr Ser
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<210>   32
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1               5                   10                  15

Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
            20              25                  30

Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Arg Glu Leu Gln
            35              40              45

Val Ile Ser Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
    50              55                  60

Asn Leu Ile Ile Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65              70              75                  80

Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
                85              90                  95

Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
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                    100   105   110

Thr Ser

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<400>   33

Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
1   5   10   15

Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
            20   25   30

Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln
        35   40   45

Val Ile Asp Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
    50   55   60

Asn Leu Ile Ile Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65   70   75   80

Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
                85   90   95

Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
            100   105   110

Thr Ser

<210>   34
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<220>
<223>   IL15 mutant

<400>   34

Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
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Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
            20   25   30

Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln

```
          35                    40                         45
```

```
Val Ile Glu Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
    50                  55                  60
```

```
Asn Leu Ile Ile Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65                  70                  75                  80
```

```
Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
                85                  90                  95
```

```
Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
                100                 105                 110
```

```
Thr Ser
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```
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Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
1               5                   10                  15
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```
Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
                20                  25                  30
```

```
Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln
            35                  40                  45
```

```
Val Ile Lys Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
    50                  55                  60
```

```
Asn Leu Ile Ile Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65                  70                  75                  80
```

```
Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
                85                  90                  95
```

```
Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
                100                 105                 110
```

```
Thr Ser
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<210>   36
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<213>   Artificial Sequence

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Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
1   5   10   15

Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
            20   25   30

Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln
        35   40   45

Val Ile Arg Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
    50   55   60

Asn Leu Ile Ile Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65   70   75   80

Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
            85   90   95

Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
            100   105   110

Thr Ser

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Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
1   5   10   15

Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
            20   25   30

Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln
        35   40   45

Val Ile Ser Asp Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
    50   55   60

Asn Leu Ile Ile Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65   70   75   80

```
Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
                85              90                  95


Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
            100             105                 110


Thr Ser



<210>   38
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<220>
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<400>   38

Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
1               5               10                  15


Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
                20              25                  30


Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln
            35              40                  45


Val Ile Ser Glu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
        50              55                  60


Asn Leu Ile Ile Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65                  70              75                  80


Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
                85              90                  95


Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
            100             105                 110


Thr Ser



<210>   39
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<220>
<223>   IL15 mutant

<400>   39

Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
1               5               10                  15
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```
Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
            20                  25                  30

Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln
            35                  40                  45

Val Ile Ser Lys Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
        50                  55                  60

Asn Leu Ile Ile Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65                  70                  75                      80

Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
                85                  90                  95

Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
            100                 105                 110

Thr Ser
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<400>  40
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```
Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
1               5                   10                  15

Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
            20                  25                  30

Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln
            35                  40                  45

Val Ile Ser Arg Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
        50                  55                  60

Asn Leu Ile Ile Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65                  70                  75                      80

Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
                85                  90                  95

Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
            100                 105                 110

Thr Ser
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<400>   41
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```
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1               5                   10                  15


Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
                20                  25                  30


Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln
            35                  40                  45


Val Ile Ser Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Lys
        50                  55                  60


Asn Leu Ile Ile Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65                  70                  75                  80


Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
                85                  90                  95


Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
                100                 105                 110


Thr Ser
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<210>   42
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<400>   42
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1               5                   10                  15


Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
                20                  25                  30


Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln
            35                  40                  45


Val Ile Ser Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Arg
```

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```
           50                    55                    60
```

```
Asn Leu Ile Ile Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65                  70                  75                  80
```

```
Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
                85                  90                  95
```

```
Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
                100                 105                 110
```

```
Thr Ser
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<210>  43
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<400>  43
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Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
1               5                   10                  15
```

```
Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
                20                  25                  30
```

```
Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln
            35                  40                  45
```

```
Val Ile Ser Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
    50                  55                  60
```

```
Asp Leu Ile Ile Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65                  70                  75                  80
```

```
Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
                85                  90                  95
```

```
Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
                100                 105                 110
```

```
Thr Ser
```

```
<210>  44
<211>  114
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  IL15 mutant
```

<400> 44

```
Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
1               5                   10                  15

Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
                20              25                  30

Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln
            35              40                  45

Val Ile Ser Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
        50              55                  60

Glu Leu Ile Ile Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65                  70              75                  80

Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
            85                  90                  95

Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
            100             105             110

Thr Ser
```

<210> 45
<211> 114
<212> PRT
<213> Artificial Sequence

<220>
<223> IL15 mutant

<400> 45

```
Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
1               5                   10                  15

Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
                20              25                  30

Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln
            35              40                  45

Val Ile Ser Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
        50              55                  60

Lys Leu Ile Ile Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65                  70              75                  80

Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
            85                  90                  95
```

```
Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
            100                 105                 110

Thr Ser


<210>   46
<211>   114
<212>   PRT
<213>   Artificial Sequence

<220>
<223>   IL15 mutant

<400>   46

Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
1               5                   10                  15


Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
            20                  25                  30


Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln
            35                  40                  45


Val Ile Ser Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
    50                  55                  60


Arg Leu Ile Ile Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65                  70                  75                  80


Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
                85                  90                  95


Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
            100                 105                 110


Thr Ser


<210>   47
<211>   114
<212>   PRT
<213>   Artificial Sequence

<220>
<223>   IL15 mutant

<400>   47

Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
1               5                   10                  15


Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
            20                  25                  30
```

```
Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln
        35              40              45

Val Ile Ser Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
        50              55              60

Asn Leu Ile Asp Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65              70              75              80

Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
                85              90              95

Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
            100             105             110

Thr Ser
```

```
<210>   48
<211>   114
<212>   PRT
<213>   Artificial Sequence

<220>
<223>   IL15 mutant

<400>   48
```

```
Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
1               5               10              15

Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
            20              25              30

Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln
        35              40              45

Val Ile Ser Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
        50              55              60

Asn Leu Ile Glu Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65              70              75              80

Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
                85              90              95

Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
            100             105             110

Thr Ser
```

```
<210>   49
```

<211>   114
<212>   PRT
<213>   Artificial Sequence

<220>
<223>   IL15 mutant

<400>   49

Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
1   5   10   15

Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
            20   25   30

Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln
            35   40   45

Val Ile Ser Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
        50   55   60

Asn Leu Ile Lys Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65   70   75   80

Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
                85   90   95

Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
            100   105   110

Thr Ser

<210>   50
<211>   114
<212>   PRT
<213>   Artificial Sequence

<220>
<223>   IL15 mutant

<400>   50

Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
1   5   10   15

Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
            20   25   30

Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln
            35   40   45

Val Ile Ser Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
        50   55   60

Asn Leu Ile Arg Leu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val

```
65                    70                    75                    80
```

Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
                85   90   95

Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
              100   105   110

Thr Ser

<210> 51
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> IL-2Rbeta sense primer

<400> 51
gagagactgg atggaccc   18

<210> 52
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> IL-2Rbeta anti-sense primer

<400> 52
aagaaactaa ctcttaaaga ggc   23

<210> 53
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> IL-2Ralpha sense primer

<400> 53
agtccagcgg tgtcctgtgg   20

<210> 54
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> IL-2Ralpha anti-sense primer

<400> 54
tcataggtgg tgagagcagt   20

<210> 55
<211> 28
<212> DNA
<213> Artificial Sequence

```
<220>
<223>  IL-2 sense primer

<400>  55
aactgcaggc acctacttca agttctac                                    28


<210>  56
<211>  28
<212>  DNA
<213>  Artificial Sequence

<220>
<223>  IL-2 anti-sense primer

<400>  56
tcccccgggt caagtcagtg ttgagatg                                    28


<210>  57
<211>  27
<212>  DNA
<213>  Artificial Sequence

<220>
<223>  IL-15Ralpha-IL-2 sense primer

<400>  57
gggaagctta gtccagcggt gtcctgt                                     27


<210>  58
<211>  26
<212>  DNA
<213>  Artificial Sequence

<220>
<223>  IL-15Ralpha-IL-2 anti-sense primer

<400>  58
aactgcagag tggtgtcgct gtggcc                                      26


<210>  59
<211>  27
<212>  DNA
<213>  Artificial Sequence

<220>
<223>  sense primer for rat prepolactin signal peptide

<400>  59
ggggtaccat caccatgaac agccaag                                     27


<210>  60
<211>  27
<212>  DNA
<213>  Artificial Sequence

<220>
<223>  antisense primer for rat preprolactin signal peptide

<400>  60
cgggatccgg tctgcacatt ttggcag                                     27


<210>  61
```

```
<211>   28
<212>   DNA
<213>   Artificial Sequence

<220>
<223>   sense primer for mature human IL-15

<400>   61
cgggatccaa ctgggtgaat gtaataag                                        28


<210>   62
<211>   26
<212>   DNA
<213>   Artificial Sequence

<220>
<223>   antisense primer for mature human IL-15

<400>   62
ggaattctca agaagtgttg atgaac                                          26


<210>   63
<211>   8
<212>   PRT
<213>   Artificial Sequence

<220>
<223>   FLAG tag

<400>   63

Asp Tyr Lys Asp Asp Asp Asp Lys
1               5


<210>   64
<211>   30
<212>   DNA
<213>   Artificial Sequence

<220>
<223>   FLAG tag oligo

<400>   64
gatcggacta caaggatgac gatgacaagc                                     30


<210>   65
<211>   30
<212>   DNA
<213>   Artificial Sequence

<220>
<223>   FLAG tag oligo

<400>   65
gatcgcttgt catcgtcatc cttgtagtcc                                     30


<210>   66
<211>   18
<212>   DNA
<213>   Homo sapiens

<400>   66
gaaaatctga tcatccta                                                  18
```

<210> 67
<211> 6
<212> PRT
<213> Homo sapiens

<400> 67

Glu Asn Leu Ile Ile Leu
1   5

<210> 68
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> IL15 mutant

<400> 68

Lys Asn Leu Ile Ile Leu
1   5

<210> 69
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> IL15 mutant

<400> 69

Arg Asn Leu Ile Ile Leu
1   5

<210> 70
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> IL15 mutant

<400> 70

Glu Asp Leu Ile Ile Leu
1   5

<210> 71
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> IL15 mutant

<400> 71

Glu Glu Leu Ile Ile Leu
1   5

<210> 72
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> IL15 mutant

<400> 72

Glu Lys Leu Ile Ile Leu
1   5

<210> 73
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> IL15 mutant

<400> 73

Glu Arg Leu Ile Ile Leu
1   5

<210> 74
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> IL15 mutant

<400> 74

Glu Asn Leu Ile Asp Leu
1   5

<210> 75
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> IL15 mutant

<400> 75

Glu Asn Leu Ile Glu Leu
1   5

<210> 76
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> IL15 mutant

<400> 76

Glu Asn Leu Ile Lys Leu

1   5

<210> 77
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> IL15 mutant

<400> 77

Glu Asn Leu Ile Ile Asp
1   5

<210> 78
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> IL15 mutant

<400> 78

Glu Asn Leu Ile Ile Glu
1   5

<210> 79
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> IL15 mutant

<400> 79

Glu Asn Leu Ile Ile Lys
1   5

<210> 80
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> IL15 mutant

<400> 80

Glu Asn Leu Ile Ile Arg
1   5

<210> 81
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> IL15 mutant

<400> 81

```
Glu Asn Leu Ile Arg Leu
1               5
```

```
<210>   82
<211>   114
<212>   PRT
<213>   Artificial Sequence

<220>
<223>   IL15 mutant

<400>   82
```

```
Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
1               5               10              15
```

```
Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
            20              25              30
```

```
Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln
        35              40              45
```

```
Val Ile Ser Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
        50              55              60
```

```
Asn Leu Ile Ile Asp Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65              70              75              80
```

```
Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
            85              90              95
```

```
Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
            100             105             110
```

```
Thr Ser
```

```
<210>   83
<211>   114
<212>   PRT
<213>   Artificial Sequence

<220>
<223>   IL15 mutant

<400>   83
```

```
Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
1               5               10              15
```

```
Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
            20              25              30
```

```
Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln
        35              40              45
```

```
Val Ile Ser Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
    50              55              60

Asn Leu Ile Ile Glu Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65              70              75              80

Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
                85              90              95

Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
            100             105             110

Thr Ser
```

```
<210>   84
<211>   114
<212>   PRT
<213>   Artificial Sequence

<220>
<223>   IL15 mutant

<400>   84
```

```
Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
1               5               10              15

Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
            20              25              30

Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln
        35              40              45

Val Ile Ser Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
    50              55              60

Asn Leu Ile Ile Lys Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65              70              75              80

Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
                85              90              95

Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
            100             105             110

Thr Ser
```

```
<210>   85
<211>   114
<212>   PRT
<213>   Artificial Sequence
```

<220>
<223> IL15 mutant

<400> 85

Asn Trp Val Asn Val Ile Ser Asp Leu Lys Lys Ile Glu Asp Leu Ile
1   5   10   15

Gln Ser Met His Ile Asp Ala Thr Leu Tyr Thr Glu Ser Asp Val His
                20   25   30

Pro Ser Cys Lys Val Thr Ala Met Lys Cys Phe Leu Leu Glu Leu Gln
            35   40   45

Val Ile Ser Leu Glu Ser Gly Asp Ala Ser Ile His Asp Thr Val Glu
        50   55   60

Asn Leu Ile Ile Arg Ala Asn Asn Ser Leu Ser Ser Asn Gly Asn Val
65   70   75   80

Thr Glu Ser Gly Cys Lys Glu Cys Glu Glu Leu Glu Glu Lys Asn Ile
                85   90   95

Lys Glu Phe Leu Gln Ser Phe Val His Ile Val Gln Met Phe Ile Asn
            100   105   110

Thr Ser